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Guide for Teachers

Agricultural Core

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Introduction

About This Guide

The *Assessments in Career Education (ACE) Guide for Teachers* has been developed to provide essential information and preparation guidelines for teachers. The intent of the guide is to serve as an instructional aid in the classroom. The guide is divided into seven sections:

Test Content — describes the content of the test.

Test Structure — describes the general format of the test.

Test Preparation — includes strategies for preparing students for taking an ACE examination, including written-response questions.

Achievement Levels — describes the six different levels of achievement.

Sample Questions — includes sample multiple-choice questions and a sample written-response question.

General Scoring Criteria — shows the general criteria used to develop specific scoring guides for written-response questions.

Sample Student Work — includes examples of student work for the sample written-response question at different score points with commentary.

Teachers are encouraged to reproduce portions or all of the guide for classroom use.

Student Eligibility

The ACE in Agricultural Core may be taken by a student only one time. For this reason, it is important for students to take the examination when they are fully prepared. Prior to taking the examination, students should complete the appropriate coursework that provides instruction in all of the standards covered by the examination. For example, students enrolled in a two-year agricultural core program should wait until the end of their second year to take the ACE in Agricultural Core.

Test Content and Structure

Test Content

The ACE in Agricultural Core is based upon the knowledge and skills defined in the *Draft Interim Content and Performance Standards of the Superintendent's Challenge Initiative for Agricultural Education, Grades 9-10, Agricultural Career Preparation Core and the Agriculture Model Performance Standards and Integrated Activities*.

The content of this examination covers:

- the interrelationship of California agriculture with society, the economy, the environment, and natural resources
- the importance of agricultural firms and technology to the production, processing, servicing, and marketing of agricultural products
- the use of record keeping, computers, and the functions of purchasing and marketing in agricultural businesses
- leadership skills and their relationship to employability
- awareness of existing and future employment opportunities in agriculture
- operating principles of common tools and the safe operation of power tools and small engines in agriculture
- reading and using tools for measurement and performing calculations for problem solving in agriculture
- the anatomy of major animal body systems (e.g., digestive, reproductive, circulatory, nervous, muscular, skeletal, respiratory, and endocrine systems) and the basic theory of inheritance
- factors influencing animal nutrition and feeding and recognition of general symptoms of health problems
- the role of soil in plant production and the requirements for plant growth and development
- the role of nutrients, water, and pests in plant production
- awareness of renewable and nonrenewable resources used in agriculture

Test Structure

The ACE in Agricultural Core is administered in two 45-minute sessions. Each session consists of multiple-choice questions and a written-response question.

The purpose of the multiple-choice questions is to assess students' knowledge in agricultural core. The multiple-choice questions vary in complexity. Some require students to apply concepts to solve problems. This portion of the examination is machine scored. Sample questions are provided on page 6.

The written-response questions are designed to measure students' application of skills and knowledge. Students respond in writing to questions about career-related situations. The written-response questions are scored by agricultural core teachers and other professionals in the career area. Students are awarded a score point from one to four for each question, with four being the highest score. The sample multiple-choice and written-response questions, general scoring criteria, and sample student work and commentary are provided on pages 6–9.

Resource Documents

Copies of the *Draft Interim Content and Performance Standards of the Superintendent's Challenge Initiative for Agricultural Education, Grades 9-10, Agricultural Career Preparation Core* are available at <http://www.cde.ca.gov/challenge> on the Internet.

Copies of the *Agriculture Model Performance Standards and Integrated Activities* are available from the Agricultural Education Tech Preparation Consortium, Stanislaus County Office of Education, 801 County Center Three Court, Modesto, CA 95355, (209) 525-5020.

Test Preparation

Students should have a firm foundation in the essential skills needed for success in the career area tested. Sound preparation for ACE is built on classroom assignments that allow students to use and test their skills and knowledge regularly.

Students preparing for the examinations need to be able to articulate the major concepts in the career area being assessed. They must be able to analyze information, apply knowledge, solve problems, and explain their solutions.

Preparing Students for Written response Questions

Using the sample written-response question in this guide (page 6):

- discuss the wording of the sample written-response question. Help students to identify and understand the key requirements of the question (i.e., what is being asked?).
- review the general scoring criteria (page 7) with students. This will help students better understand what is expected of them.
- discuss the student work samples. Focus on the differences between the score points.

In addition:

- plan a variety of classroom activities that require students to interpret, think through, and answer written-response questions. For example:
 - define and explain terms that are common in written-response questions (e.g., “in detail,” “fully,” “list” vs. “describe” vs. “explain”).
 - model processes for “thinking through” and outlining answers to written-response questions.
 - model processes for incorporating details into answers to written-response questions.
- provide students with many opportunities to practice writing (e.g., through homework assignments, in-class projects, and classroom assessments).
- involve students in developing written-response questions and scoring guides related to content covered in your curriculum.

- have students evaluate their own answers to written-response questions, as well as the answers of their peers, using a scoring guide. Encourage students to discuss strategies for improving their own and others’ work.
- allow students to revise/improve their answers to written-response questions, based on your feedback and/or the feedback of their peers.

As an instructor:

- when you help prepare your students for the written portion of the ACE examination, you are also helping them to become better writers.
- keep in mind that you can effectively impact your students’ writing as you engage them in writing about real-world activities.
- resources at your school that are available to help enhance your students’ writing skills include:
 - the *English-Language Arts Content Standards for California Public Schools* adopted by the California State Board of Education (<http://www.cde.ca.gov/board/standards.html>), in particular, the sections entitled “Writing” and “Writing and Oral English Language Conventions.”
 - any writing initiatives currently being implemented at your high school.
 - the language arts and English language learner instructors at your high school and/or in your career cluster.

Test-taking Strategies

Several test-taking strategies may be helpful to students during an ACE examination.

When answering multiple-choice questions, students should:

- read the directions carefully.
- generate their own idea of the most accurate answer to a question before selecting from the answers provided.
- pace themselves by considering the number of questions and the time allowed.

When answering written-response questions, students should:

- read and understand all parts of the question.
 - underline the key requirements of the question.
 - think quickly of the main ideas that will serve as a framework for their response.
 - briefly outline the main ideas in a logical sequence before responding.
 - respond to all parts of the question.
 - provide accurate, clear, and detailed examples that demonstrate their knowledge of the career-area topic covered.
 - check their work when finished to make sure they have responded to all required components of the question.
-

Achievement Levels

Scores from the multiple-choice and written-response portions of the examination are combined to produce the student's overall achievement level. There are six achievement levels. Students who achieve level six are awarded high honors; those who achieve level

five are awarded honors; and those who achieve level four are awarded recognition. Students who achieve level three or below are acknowledged for their participation.

Level 6

The student has demonstrated excellent knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show excellent knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
- demonstrate excellent use of problem-solving and critical-thinking skills in modern agriculture contexts.
- show outstanding knowledge of leadership skills and their relationship to employability.
- show excellent understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.

Level 5

The student has demonstrated strong knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show substantial knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
- demonstrate very good use of problem-solving and critical-thinking skills in modern agriculture contexts.
- show strong knowledge of leadership skills and their relationship to employability.
- show substantial understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.

Level 4

The student has demonstrated solid knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show good knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
- demonstrate good use of problem-solving and critical-thinking skills in modern agriculture contexts.
- show solid knowledge of leadership skills and their relationship to employability.
- show good understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.

Level 3

The student has demonstrated basic knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show basic knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
 - demonstrate some use of problem-solving and critical-thinking skills in modern agriculture contexts.
 - show some knowledge of leadership skills and their relationship to employability.
 - show basic understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.
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Level 2

The student has demonstrated limited knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show limited knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
- demonstrate limited use of problem-solving and critical-thinking skills in modern agriculture contexts.
- show limited knowledge of leadership skills and their relationship to employability.
- show incomplete understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.

Level 1

The student has demonstrated little or no knowledge, understanding, and application of the content and concepts of agriculture core. The responses:

- show little or no knowledge and understanding of facets of modern California agriculture, including agricultural business management, animal science, plant and soil science, agricultural mechanics, and natural resources.*
- demonstrate little or no use of problem-solving and critical-thinking skills in modern agriculture contexts.
- show little or no knowledge of leadership skills and their relationship to employability.
- show little or no understanding of the skills and attributes necessary for success in tomorrow's work force in agriculture.

* A detailed description of the content covered by the ACE in Agricultural Core can be found on page 1.

Sample Test Questions

Sample Multiple-choice Questions

1. The tissue responsible for carrying water in the stem of a plant is the
 - A. fiber tissue.
 - B. parenchyma.
 - C. phloem.
 - D. xylem.
2. Which sector of the agricultural industry employs the SMALLEST percentage of people?
 - A. marketing
 - B. production
 - C. retailing
 - D. transportation

ANSWER KEY: 1. D 2. B

Sample Written-response Question

You want to plant an orchard located in an arid region of California with gentle rolling hills.

- Identify **three** methods of irrigation.
- Give an advantage and a disadvantage for each of the three methods.
- Select the best irrigation method for the orchard described above and explain why you made this choice.

What Students Are Expected to Accomplish

This written-response question is designed to assess students' general knowledge of irrigation systems and their skill in selecting an appropriate method of irrigation for land with a particular set of characteristics. In this case, it is an orchard on gentle rolling hills in an arid region of California. Students are expected to select either sprinkler irrigation or drip irrigation as

the "best" method of irrigation for the orchard, and to support their choice with an explanation that addresses (at minimum) how both terrain and efficiency influenced their selection. Additionally, responses are expected to be well organized and clearly and effectively written.

General Scoring Criteria for Written-response Questions and Problem-solving Tasks

The general criteria for each score point are outlined below. These criteria are used to develop scoring

guides that address the specific content in each written-response question or problem-solving task.

Score Point 4

Student response shows **excellent** knowledge and understanding. The response:

- completes all components of the question correctly.
- demonstrates in-depth understanding of relevant concepts.
- conveys knowledge coherently and effectively.

Score Point 3

Student response shows **substantial** knowledge and understanding. The response:

- completes all or most components of the question correctly.
- demonstrates understanding of relevant concepts; may overlook or misunderstand less important ideas.
- conveys knowledge clearly.

Score Point 2

Student response shows **partial** knowledge and understanding. The response:

- completes some important components of the question correctly.
- overlooks or misunderstands relevant concepts.
- conveys knowledge in a manner that may lack clarity.

Score Point 1

Student response shows **little or no** knowledge and understanding. The response:

- attempts to address important component(s) of the question but may do so incorrectly.
 - demonstrates little or no understanding of relevant concepts.
 - conveys knowledge in a manner that may lack clarity or focus or may impede understanding.
-

Sample Student Work

Score Point 4

There are a few different irrigation methods that a crop producer may consider when planning an operation. What method is chosen depends greatly on the gradient and water availability on the plot of land, and what type of crop is being produced.

One method is sprinkler irrigation. This may be with wheel lines, ground pipe, or overhead sprinklers. This is great for flat or slightly sloped fields, and crops that need careful water management. You can move the water to any area necessary, but it does require more expense and time than other methods. Not only is there the cost of a pump, but also for the sprinkler equipment.

Another method is flood irrigation. On a slightly sloped land plot, this is very effective. Crops such as rice and taro require water 6" or deeper to grow in. However, for certain types of slopes this may cause undesired erosion, so special measures must be taken to control erosion.

A third method is sub-irrigation. This is when a water system is installed which keeps water (moisture content) at the optimum level below ground — sub-soil. This is good in areas where there is a good water supply and with deep root crops. However, this is not a preferred method of irrigation with any type of crop besides deep-rooted, such as alfalfa. Otherwise, it is ineffective. Water must be available below the soil surface.

The method of irrigation I recommend for an orchard on rolling hills is sprinkler irrigation. Flood irrigation is out of the question because I would lose my topsoil in a year, and hills do not usually have sufficient water sources at sub-soil depths.

With a sprinkler system on the ground, laid out between trees, I could water above soil without much labor. (I could not use wheel lines, since they would be near-impossible to move between rows.) I could keep the surface of the soil damp, since there is not much rainfall in this area.

Commentary

The response correctly identifies three different methods of irrigation (i.e., sprinkler, flood, subirrigation) and fully describes one advantage and one disadvantage for each method. An appropriate “best” method of irrigation for the orchard (i.e., sprinkler) is selected, and an explanation to support the choice is provided. The response demonstrates an excellent understanding that both terrain and efficiency (among other factors) are important considerations when selecting an appropriate method of irrigation. The knowledge is conveyed coherently and effectively.

Sample Student Work

Score Point 3

If I wanted to plant an orchard located in an arid region of California with gentle rolling hills, I could use many different methods of irrigation. One would be flooding because it would soak in. One disadvantage would be, it would all go into the valley parts of the hills and not stay on the hills, one advantage would be that the orchard part in the valleys will survive easily. Another type of irrigation is sprinklers and one disadvantage is that it may miss a spot or two and that stuff could dry up, and one advantage is that it does the job fairly evenly. The best method of irrigation, I think, would be drip irrigation one, because it would get to every spot and not give one spot more than the other, but a disadvantage is that it's expensive, so not every farmer person can buy it and make it.

Commentary

The response correctly identifies three different methods of irrigation (i.e., flood, sprinkler, drip) and describes, in more general terms, one advantage and one disadvantage for each method. An appropriate “best” method of irrigation for the orchard (i.e., drip) is selected and an explanation to support this choice is provided. The explanation is somewhat limited (i.e., addresses efficiency, but does not clearly address how terrain influenced the selection of an appropriate irrigation system for the orchard). The knowledge is conveyed relatively clearly.

Score Point 2

Three methods of irrigation are flood, drip and sprinklers. The advantages and disadvantages of these methods are that to flood a hill is a disadvantage, because it would just run off the hill, there is no advantage. The advantage for drip is that the plant will get directly watered, the disadvantage for drip is that the water could run off the plant. The advantage for sprinklers is that it waters everywhere. The best method of irrigation for the orchard is the drip, because it will water each plant.

Commentary

The response correctly identifies three different methods of irrigation (i.e., flood, drip, sprinkler) but does not describe both an advantage and disadvantage for each method. An appropriate “best” method of irrigation for the orchard (i.e., drip) is selected and an explanation that supports the choice is provided. The explanation lacks clarity and development.

Score Point 1

The best method for irrigation is a drip sistem, a drip system is easy to control and is very cheep, and dos not use much water. This is good because I want to save as much water as posible.

Commentary

The response correctly identifies only one method of irrigation (i.e., drip). The method would be appropriate for the orchard. Several advantages of drip irrigation are listed, but a disadvantage is not provided. The response shows little or no knowledge of different irrigation methods.

Acknowledgments

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officials provide support by registering their districts and schools for the ACE examinations, acknowledging the importance of these career areas and understanding the need to recognize student achievement. Higher education and industry representatives ensure that the content of the examinations provides an appropriate foundation for further education, training, and work in a related career area.

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